MATHEMATICAL PHYSICS COURSES FOR 2009

MTH 434/534: DIFFERENTIAL GEOMETRY
MTH 437/537: GENERAL RELATIVITY

MTH 434/534: Winter 2009

This course is a self-contained introduction to the many uses of differential forms. This approach emphasizes geometric content in a coordinate independent way; a good analogy is the use of vectors, rather than their components, to describe a given situation. While we will spend some time developing the necessary mathematical tools, we will also apply these tools to concrete examples drawn from the physical sciences.

The main prerequisite is a certain amount of scientific maturity, rather than background in a particular area. The only specific requirements are a working knowledge of multivariable calculus and linear algebra.

(The content of MTH 434/534 varies considerably depending on who teaches it. If you have previously taken this course from another instructor, and are interested in taking it again, please see me.)

MTH 437/537: Spring 2009

This course is a nearly self-contained introduction to general relativity. We will study Einstein's theory of relativity, one of the most mathematically elegant physical theories ever proposed. In essence, this theory says that gravity is curvature!

After briefly considering special relativity from a geometric point of view we will then study the Einstein field equations. We will examine several special solutions of these equations, including simple cosmological models, such as the Big Bang, and black holes.

The recommended prerequisite for this course is MTH 434/534 (see below).

Further information:

It is *strongly* recommended that students interested in the relativity course plan to take both courses, which form a natural sequence. Students interested in trying to do otherwise, including those who have already taken MTH 434/534, are encouraged to discuss this with me as soon as possible.

MTH 434/534 is currently scheduled for MWF at 1 PM. Interested students for whom this represents a conflict should let me know immediately, as it might be possible to change the time.

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